



A FOUR-YEAR PLAN FOR CLIMATE ACTION



MAINE

WON'T WAIT

MAINE CLIMATE COUNCIL

Maine Climate Council

NEWMOA: Deconstruction: Benefits & Challenges at Brownfields & Other Waste Site Cleanup Projects

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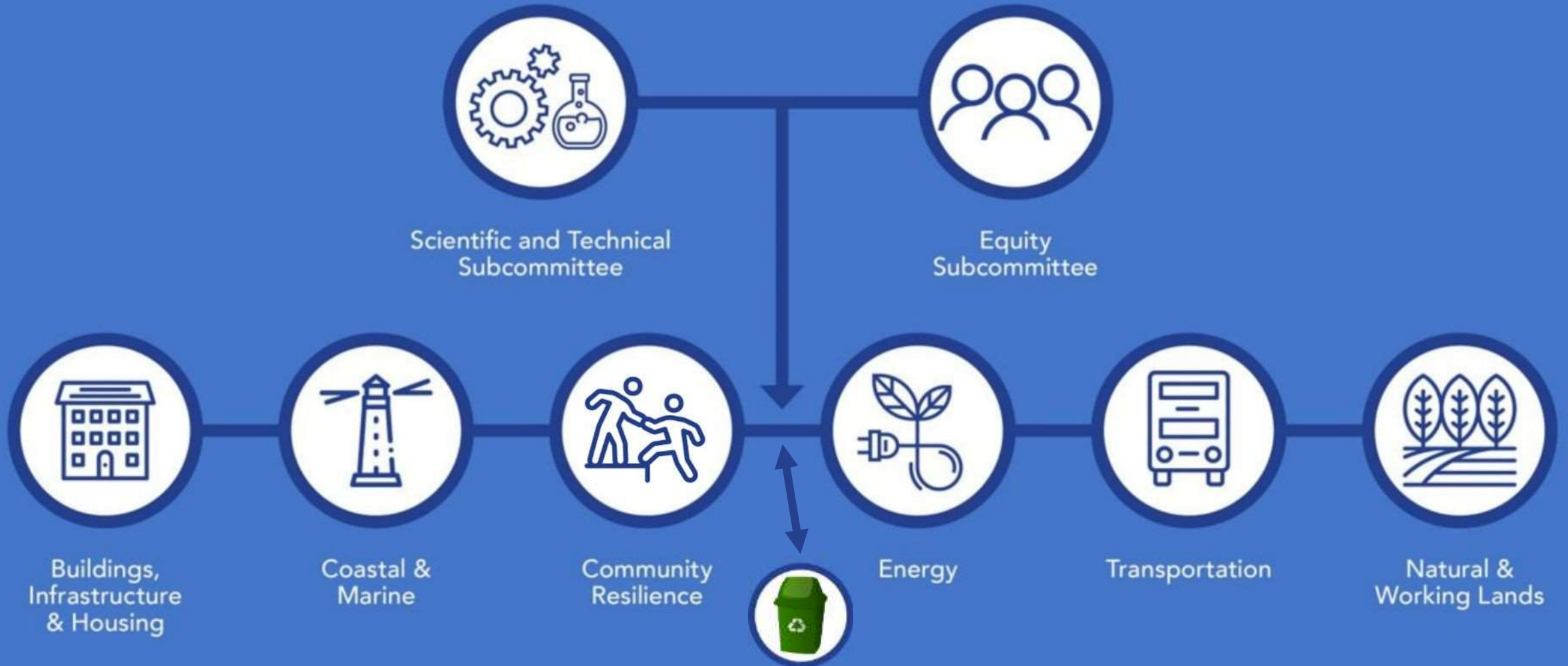
GOVERNOR'S OFFICE OF
Policy Innovation
and the Future



MAINE DEPARTMENT OF
Environmental Protection

Tuesday, March 11th, 2025

Maine Climate Council



CLIMATE COUNCIL GOALS



12.01.24

Updated Climate Action
Plan Due



Achieve State Carbon
Neutrality by
2045

REDUCE MAINE'S GREENHOUSE GAS EMISSIONS BY
TARGETS OUTLINED IN STATE LAW

45%

BELOW 1990 LEVELS
BY 2030

80%

BELOW 1990 LEVELS
BY 2050



ENSURE MAINE PEOPLE, INDUSTRIES, AND COMMUNITIES ARE RESILIENT
TO THE IMPACTS OF CLIMATE CHANGE.

Maine Won't Wait Goals:



1. Reduce Maine's **greenhouse gas emissions**
2. Strengthen **resilience** to climate impacts
3. Create **jobs** and **economic prosperity**
4. Bring climate action to **all Maine people**



Maine Won't Wait Strategies:

A _____

Embrace the future of transportation in Maine



B _____

Modernize Maine's buildings: energy-efficient, smart, and cost-effective homes and businesses



C _____

Transition to clean energy



D _____

Create jobs and grow Maine's economy through climate action



E _____

Protect the environment and natural and working lands and waters in Maine



F _____

Build healthy and resilient communities



G _____

Engage with Maine people on climate action



Promote the manufacture and use of climate-friendly building products



Actions:

- Require large commercial and state-funded buildings to be **designed for deconstruction** and reuse
 - Global warming potential from buildings would be **reduced by 88%** if they were designed for reuse rather than recycling

Actions:

- **Divert demolition debris from landfills** by encouraging municipalities to give two weeks' notice for **salvage** opportunities
 - Posting two-weeks public notice of pending demolitions along with a **liability waiver** to reduce risk would enable building materials salvage and **reduce debris disposal**

Continue to lead by example in publicly-funded buildings



Federal Guidance on Low Carbon Building Materials

- EPA notes that there has been “**very little recognition of salvage and reuse**” as **low embodied carbon materials**, and that reuse “has not been institutionalized in federal building and infrastructure procurement” (also true for most states and municipalities)
- “However, a growing number of federal programs and policies recognize the potential cost savings and **clear environmental benefits** of salvaged and reused materials, including:
 - **DOE’s Re-X Before Recycling Grant program** - Provides funding for innovations that extend the useful lifetimes of products or parts - including products or parts relevant to construction - to reduce life cycle energy use and emissions.
 - **GSA’s P100 Facilities Standards for the Public Buildings Service** - Incorporates new standards and principles such as design for reuse, product durability, material reuse, and **deconstruction of buildings**.
 - **DOD Memo** - Understanding and Reducing Embodied Emissions in Buildings - Outlines a whole life cycle approach to **reducing embodied carbon** in Department of Defense construction projects, including design strategies that consider adaptability, resilience, material efficiency and recovery of materials for reuse.”

Leading by Example:

- Maine is part of the Federal State Buy Clean Partnership, working with the U.S. Climate Alliance to actively explore collective opportunities to procure building and construction materials with **lower embodied carbon**.



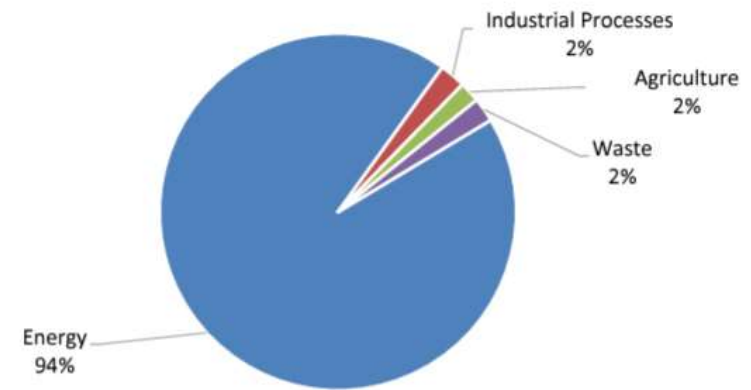


- Construction and demolition are significant drivers of global emissions, consuming **"roughly a third of all resources"** extracted every year" while producing "just under a third of **all the world's waste"**
- If we deconstructed the **200,000 to 300,000** homes currently being demolished in the U.S. every year, we'd have enough reclaimed lumber to build about **100,00 new homes.**

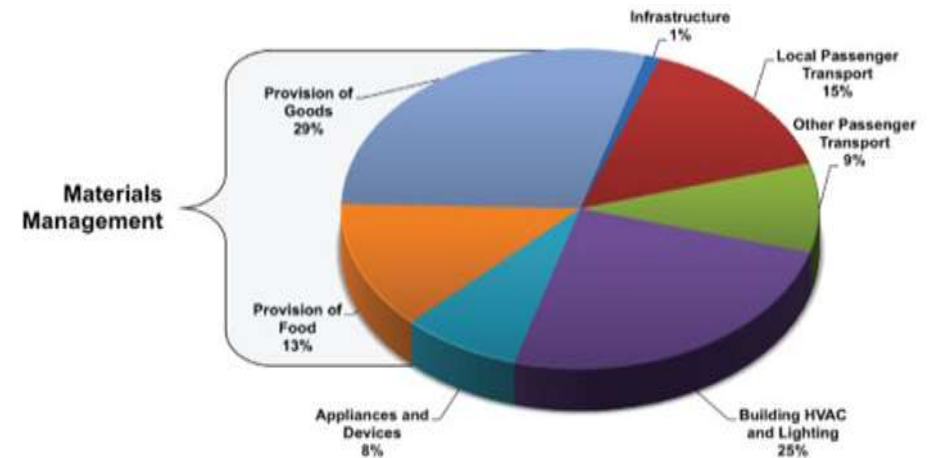


Materials Management: Thinking in Systems

- **Sector-based, territorial view:** Waste is a tiny sliver of our emissions! To address them, we should divert our waste streams from disposal through recycling, composting, and anaerobic digestion.
- **Systems-based, global view:** Material management makes up a massive percent of our emissions! To address this, we should rethink how we consume and dispose of material resources.
- **Resource extraction** has tripled over the past 50 years and there is significant scientific consensus that this a “major causal factor” of climate change, biodiversity loss and pollution.



Maine's gross greenhouse gas emissions by source category, 2021 (includes biogenic emissions)

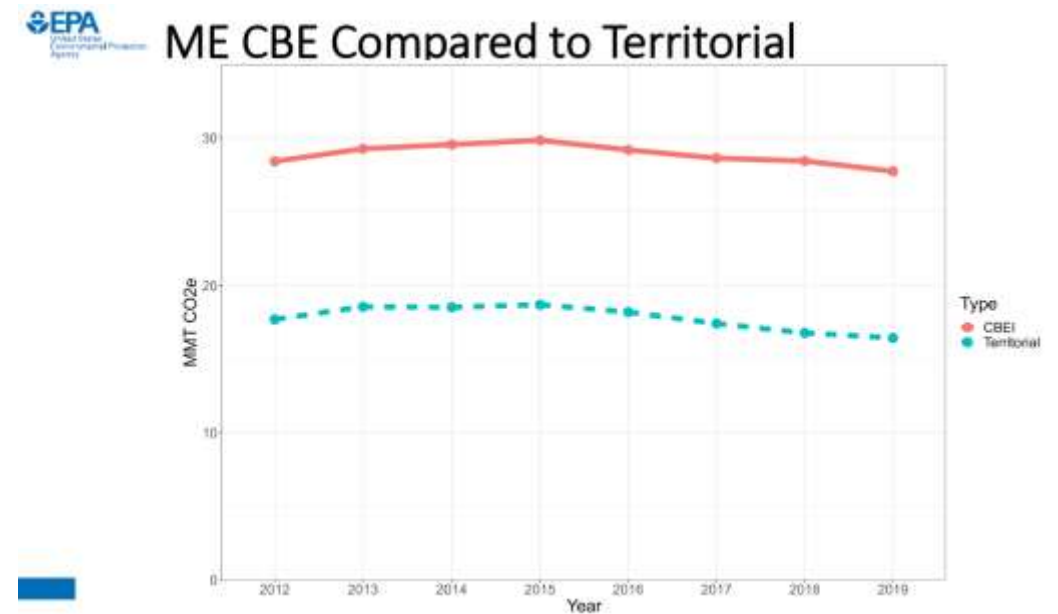


EPA's systems-based greenhouse gas inventory for U.S. emissions, 2006



Embodied Carbon (Consumption-Based Emissions)

- Practices that **preserve materials** (and associated emissions from resource extraction, processing, manufacturing, transport, etc.) reduce consumption-based emissions
- Maine has made **great strides** in reducing territorial emissions:
 - As of 2021, GHGs were **30 percent lower than 1990** levels, surpassing the medium-term goal of 10 percent below 1990 levels by January 1, 2020.
 - **91 percent** of Maine's GHGs are offset by natural sequestration, meaning we are very close to total carbon neutrality for direct, territorial emissions!



EPA Maine CBE Slide for Presentation for May Materials Management Task Force Meeting

Embodied emissions will be of **increasing interest and importance** as clean energy and energy efficiency gains reduce our operational and territorial carbon emissions.



- Reusing just **50,000 tons of wood flooring** reduces GHGs by **141,284 (MTCO2E)** - equivalent to annual emissions from **29,997 gas-powered passenger vehicles** (cars, trucks, vans, SUVs)
- Reuse **preserves the value** of irreplaceable materials like heritage timber from old growth lumber

Building Materials Reuse

- **90%** of construction and demolition debris is from **demolition**; only 10% is from construction scrap
- A statewide **Waste Characterization Study** currently underway will provide Maine with better data on materials in construction and demolition debris waste stream, highlighting opportunities for diversion programs targeting specific materials
- In 2022, **609,506 tons** of construction and demolition debris was **generated** in Maine; just **2.37% was diverted from landfill**

Deconstruction Terms to Know

- **Demolition:** the process of tearing down buildings and other structures.
- **Deconstruction:** the process of carefully disassembling, preserving, and reusing elements of buildings and structures to extract maximum value of material for future reuse or recycling.
- **Soft Stripping:** the process of removing easy, high-value materials such as solid, paneled interior doors, lighting fixtures, glass windows, or hardwood flooring from buildings prior to demolition.
- **Whole Home:** a full deconstruction that includes soft stripping and goes further to take apart and salvage the structural elements such as lumber, sheathing, and even bricks.
- **Embodied Carbon:** the total amount of greenhouse gas emissions (GHGs) that occur during the production, transportation, extraction, and manufacturing of a product or building.



Workforce Development Opportunities

- Reuse/refurbishment produces **300 jobs per 10,000 tons of waste**
 - Landfilling and incineration produces about 1-6 jobs per 10,000 tons of waste
- Circular jobs often "cite **higher wages and better working conditions** than comparable fields, and opportunities to develop and use varied skills, from equipment repair to public outreach
 - Programs like the **Campaign for Historic Trades** link deconstruction and historic preservation with traditional skill building for **climate-positive green jobs** focused on building repair and materials reuse/refurbishment
 - Pairing **construction and deconstruction training** allows for "development of a new capable workforce of contractors at all experience levels"
 - "Reuse warehouses, markets, and community hubs where the skill and craft of refurbishing materials for reuse is learned" also help **build a sense of place** and community
- Public-private partnerships are a **promising economic development pathway**. For example, Phoenix's reuse/refurbishment hub resulted in the launch of 19 companies, filing of 14 patents, and development of 15 products over the course of 6 years.



Why Deconstruction at Brownfields?

- The brownfields approach has **evolved** in recent years
- Redevelopment now integrates environmental cleanup and economic revitalization with community development, aligning with the “**triple-bottom line** approach” to sustainable development based on people, planet, and profit
- Demolishing buildings leads to landfilling vast quantities of material resources at **huge financial and environmental costs**
- Deconstruction “creates jobs, spurs local innovation and industry, **preserves local character and heritage**, reduces landfilled waste and landfill costs, and limits the need for virgin (and often carbon-intensive) materials”
 - - *C40 Cities Climate Leadership Group, C40 Knowledge Hub*



Assessing Deconstruction Potential at Brownfields

- In 2024, EPA awarded 14 communities approximately \$7 million in Brownfields Job Training Grants to recruit and train **unemployed and underemployed individuals** with the skills needed to secure long-term employment in the environmental field
- EPA Office of Brownfields and Land Revitalization provides multiple resources to determine the feasibility of deconstruction and materials reuse:
 - ✓ [Checklist for Assessing the Feasibility of Building Deconstruction for Tribes and Rural Communities](#)
 - ✓ [Building Material Reuse and Recycling Estimating Tool](#)
 - ✓ [Deconstruction Rapid Assessment Tool](#)
- [EPA's Greener Cleanups Initiative](#) encourages reusing deconstruction materials on-site and the recycling of construction and demolition debris
- The Army Corps of Engineers "[Market-Smart](#)" [Deconstruction and Material Recovery at Brownfield Sites](#) provides tools and guidance for brownfields partners to assess the potential of extracting construction material assets from buildings, structures, and infrastructure on brownfield sites, and to reuse or recycle this material.



U.S. Army Corps of Engineers on Deconstruction

The U.S. Army Corps of Engineers (USACE) "[Market-Smart Deconstruction and Material Recovery at Brownfield Sites](#)" describes brownfields redevelopment as a "chance to redevelop the site in a way that **enhances the community**, creates a viable financial opportunity...and restores the environment," noting materials recovery is a crucial piece of this work that:

- "is a ranking criterion for many **brownfield grants**
 - **saves money**, conserves resources and **energy**
 - extends the life of landfills
 - creates jobs and **supports local businesses**
 - provides **job training** through deconstruction
 - can earn LEED credits
 - is the **right thing** to do!"
- The USACE also notes that "building material reuse and recovery must be part of the project planning and contracting process" not something that is **inserted as an afterthought**
 - This includes **wrapping goals or requirements** for deconstruction and materials recovery into an RFP
 - USACE guidance provides detailed information on material pathways for recovery, considerations for **hazardous materials** (asbestos, lead, etc.), and much more...



The Triple-Bottom Line of Deconstruction

- **Social:** Lower-income communities, often communities of color, are disproportionately impacted by demolition and its **harmful side effects**. Demolition releases hazardous particulates such as lead, asbestos, mercury, arsenic, crystalline silica, into the air and may make their way into groundwater, **contaminating drinking water supply**. Spray to reduce airborne particles releases stormwater runoff with those same contaminants, again posing a risk to the water supply. Manual deconstruction is a **safer alternative**.
- **Economic :** A recent study from Cornell estimated that “converting half to three-quarters of residential building demolitions to deconstructions would have a direct economic impact of **\$872 million to \$1.4 billion**; create between 8,130 and 12,630 jobs; and reclaim 270,000 to 420,000 tons of materials for reuse – “all of which could **foundationally reshape an entire sector** of the New York state economy.”
- **Environmental:** Building deconstruction maximizes use of material resources, generating **low-cost, low carbon building materials** for reuse, reducing waste sent to landfills, and reducing emissions both upstream from producing new materials and downstream from landfills.



An average 1,500 square foot house represents approximately **41.3 tons of embodied energy**.

41.3 tons of embodied energy is equivalent to GHG emissions from:



8.1 passenger vehicles driven for one year



92,970 miles driven by an average passenger vehicle



4,778,215 number of smartphones charged



6.3 homes' electricity use for one year

C40 Overview: Deconstruction Policy Tools

- Globally, many cities have enacted policies to reduce embodied carbon through material reuse, design standards for reuse, and end-of-life requirements to **deconstruct and reuse building materials** over demolition and disposal.
- The C40 recommends a **comprehensive planning** and implementation approach:
 - ✓ Conduct a **cost-benefit analysis** of deconstruction, building material reuse and design for disassembly in the city
 - ✓ Involve a **wide range of stakeholders** in the planning and implementation of deconstruction policies
 - ✓ Develop the local deconstruction market with **municipal procurement** and training
 - ✓ Harness **neighborhood activism** and partner with heritage organizations
 - ✓ Establish or support **local marketplaces** for material reuse
 - ✓ Promote voluntary deconstruction with grants and **permitting incentives**



A Snapshot of Deconstruction in U.S. Climate Plans

- At least one other state and multiple counties and municipalities across the U.S. have deconstruction and building materials reuse in their **Climate Action Plans**
 - **Portland and South Portland (ME)** will: Foster the growth of the building material reuse marketplace for deconstructing, reusing, and recycling building materials
 - The **State of Minnesota** will: Incentivize the rehabilitation of existing buildings that include energy, resilience, and efficiency upgrades. Provide tools to assess buildings' adaptive reuse potential. Promote the reuse and recycling of demolition materials.
 - **San Antonio, TX** will: Accelerate the acceptance of low-waste construction projects through education, incentives and partnerships, and continue to pursue zero-landfill waste practices for all construction projects
 - A growing number of municipalities have passed ordinances to support deconstruction
 - ✓ **Portland, OR** passed the first US deconstruction ordinance in 2016
 - ✓ Cities with **ordinances or programs** supporting deconstruction include Milwaukee, WI, Palo Alto, CA, Pittsburgh, PA, Cleveland, OH, San Jose, CA, and San Antonio, TX
 - ✓ Cities and states are developing policies for **CDD recovery or deconstruction** including Baltimore, MD, San Francisco, CA and 15 states (CT, CA, HI, IL, MA, NH, NM, ND, OH, OR, PA, RI, VT, WI)



The Biggest Systemic Barrier? Cheap, Easy Disposal

- A study from Cornell notes: “Demolition and landfilling have **benefited from low upfront costs** that do not account for the long-term costs of landfills, emissions and health impacts that disproportionately affect vulnerable communities...80% of what is landfilled – from wooden and steel structural beams to floorboards or fixtures – still holds economic value, representing a “**massive untapped opportunity.**”
- If **negative externalities** (material loss, embodied carbon, landfill emissions, negative community impacts, etc.) were accounted for in disposal tip fees, they would be **much higher**.
 - The social costs of one CDD landfill’s direct emissions were estimated at **\$21,405** per year
 - That cost jumps to **\$2,035,731** if upstream (consumption-based) emissions are included
- Maine’s CDD disposal fees averaged **\$96 per ton** in 2022 – some as low as \$17 per ton.



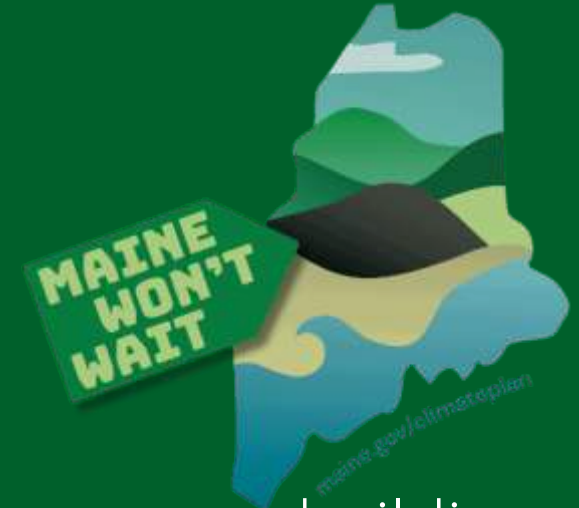
*“One of the biggest challenges is we’re working against a system that’s been completely **designed to make it easy for people to throw things away**...It’s cheap to landfill materials so there’s not a really strong economic incentive to look for opportunities to not throw things away...the whole system is very much geared toward making it convenient to throw things away.” - Mike Gable, President of Build Reuse (a nonprofit dedicated to building material reuse)*

“We recycle bottles but throw away our houses.”

- Portland, OR Deconstruction Contractor noting the irony of Portland’s strong recycling and thrifting/reuse ethic that didn’t apply to building materials until their ordinance passed in 2016.



Suggested Climate Actions



- Businesses can adopt policies that prioritize use of salvaged materials as part of their climate and sustainability goals
- Municipalities can adopt policies to renovate and deconstruct buildings and repurpose building materials
- Homeowners can seek out salvaged materials for home renovation projects
- Contractors, tech and vocational schools can cross-train employees, apprentices, and students with construction and deconstruction skills for a more flexible workforce with increased market opportunities

Helpful Links & Resources

Federal Funding:

While future funding is unlikely at this time, federal government programs have funded initiatives that will support deconstruction in the future, such as developing environmental product declarations for salvaged materials:

- [Re-X Before Recycling Prize - recipients](#)
 - Intended to keep materials in use and increase recovery and reuse of end-of-use products, reducing embodied energy, strengthening regional manufacturing supply chains, and increasing U.S. security of supply, creating jobs, reducing environmental burdens related to landfilling, incineration, and extraction
- [EPA Grant to Reduce Embodied Carbon - recipients](#)
 - Many funded projects focused on building deconstruction and material reuse including developing Environmental Product Declarations (EPDs) for salvaged materials, training and workforce development, market development, technical assistance, resources for businesses to quantify benefits, and more

Articles, Organizations, and More:

- [Massachusetts Deconstruction Workgroup](#)
- [Build Reuse](#)
- [Green and Healthy Homes Maine blog on deconstruction](#)
- [Deconstruction: Rethinking the Building Life Cycle](#)
- [Carbon leadership forum deconstruction policy toolkit](#)
- [The Campaign for Historic Trades](#)
- [CROWD Network \(NY\)](#)



Join the Maine Deconstruction Network!

Are you located in Maine and interested in working together to **move deconstruction** forward?

The Maine Deconstruction Network is forming in 2025. Your participation is welcome!

The Network is an informal network of individuals interested in the economic opportunities and environmental benefits of building deconstruction who want to raise awareness and help Maine transition from a linear building economy to a circular one.

The network will meet on a recurring basis depending on member availability either quarterly or monthly and will work together to engage different entities in deconstruction, identify any potential opportunities to pilot deconstruction projects, consider how we can support local governments, communities, and small businesses in efforts to move towards deconstruction over demolition.



Scan to visit the Materials Management Task Force webpage, where you can download resources or sign up to become part of the **Maine Deconstruction Network**.

Questions? E-mail Megan.MansfieldPryor@maine.gov.



To engage with the Maine Climate Council,

Follow us on Instagram @maineclimatecouncil

Sign up for our newsletter



Read the plan!





Explore [Maine.gov/climateplan](https://maine.gov/climateplan)



Explore an interactive map showing how climate change is impacting our state's landscape, economies and recreation.

Learn about *Maine Won't Wait*, our state's climate action plan to reduce greenhouse gas emissions and secure a strong future for our people and economy.

Mainers from every corner of the state are taking action and confronting climate change.

GUIDES TO CLIMATE ACTION & INCENTIVES

WHAT CAN YOU DO?

FOR YOUR HOME

WHAT CAN YOU DO?

FOR YOUR VEHICLE

WHAT CAN YOU DO?

FOR YOUR BUSINESS

WHAT CAN YOU DO?

FOR YOUR COMMUNITY

Climate&Me

A new initiative to engage young Mainers in climate action

Check out the website for resources on how to get involved



Follow us on Instagram to learn about upcoming events
[@MaineClimateCouncil](https://www.instagram.com/MaineClimateCouncil)

Connect with initiative lead
Abigail Hayne
abigail.hayne@maine.gov



Information and inspiration for young Mainers about climate change, the State's climate action plan, and how youth can get involved and make a difference.

